REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
07-12-2010	Presentation	07-12-2010 to 07-12-2010

4. TITLE AND SUBTITLE

Emerging Contaminant Program: Program Update

5a. CONTRACT NUMBER

Not applicable

5b. GRANT NUMBER

Not applicable

5c. PROGRAM ELEMENT NUMBER

Not applicable

6. AUTHOR(S)

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5d. PROJECT NUMBER

Not applicable

5e. TASK NUMBER

Not applicable

5f. WORK UNIT NUMBER

Not applicable

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Office of the Deputy Under Secretary of Defense (Installations & Environment)
1225 South Clark Street, Suite 1500
Arlington, VA 22202

8. PERFORMING ORGANIZATION REPORT NUMBER

Not applicable

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Office of the Deputy Under Secretary of Defense (Installations & Environment)
1225 South Clark Street
Suite 1500
Arlington, VA 22202

10. SPONSOR/MONITOR'S ACRONYM(S)

ODUSD(I&E)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

Not applicable

12. DISTRIBUTION/AVAILABILITY STATEMENT

DISTRIBUTION A. Approved for public release: distribution unlimited.

13. SUPPLEMENTARY NOTES

Not applicable

14. ABSTRACT

Emerging Contaminants (ECs) have no existing peer-reviewed toxicity values or health standards or the existing standards are being re-evaluated due to new science. The Department of Defense has developed a three-tiered process for over-the-horizon scanning for ECs, conducting impact assessments in five DoD functional areas, and development of risk management options. The five functional areas are: (1) Environmental, Safety and Health, (2) Mission/Readiness, (3) Acquisition, (4) Operation and Maintenance of DoD Assets, and (5) Cleanup. This presentation will describe the national and international trends related to risk assessment, analytical procedures, and overall chemical management. It will then provide an update on DoD's EC Program to include the status of DoD's EC watch and action lists, results of impact assessments, and on-going and planned risk management actions for chemicals and materials that have high risks for DoD. These risk management actions have been approved by DoD's cross-functional EC Governance Council. Attendees will become informed about the nature of risks and issues posed by ECs and DoD's initiative to address these risks and issues.

15. SUBJECT TERMS

Emerging contaminants, risk assessment, risk management,

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Mr. Paul Yaroschak
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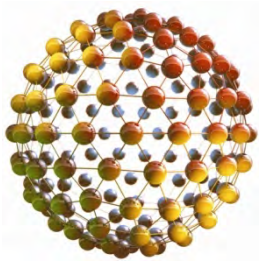
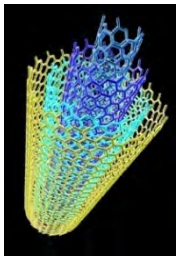
Emerging Contaminants Program

Acquisition, Technology and Logistics

Program Update





DEPARTMENT OF DEFENSE MERIT Materials of Evolving Regulatory Interest Team

Paul Yaroschak, Deputy Director
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Office of the Secretary of Defense

Trends

- **Use of Precautionary Principle**
  - Must understand health & environmental effects before using chemicals
- **Biomonitoring – What's showing up in humans?**
  - Centers for Disease Control's national biomonitoring & California voluntary program
- **Evolving Risk Assessment Science & Process**
- **Strict Chemical Management**
  - Cradle to grave
- **Green Chemistry**
- **International, Federal, & State Toxic Substances Laws**
  - Restrictions or banning of chemicals/materials (e.g., BPA)
  - California Green Chemistry Law
  - Minnesota "Toxic Free Kids Act"
  - Pending TSCA[1] reform

[1] Toxic Substances Control Act

What is an Emerging Contaminant?

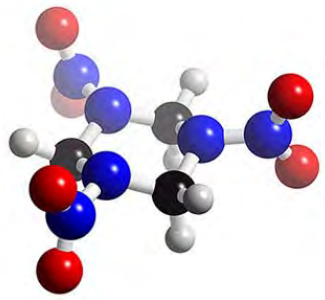
- Chemicals & materials that have pathways to enter the environment and present potential unacceptable human health or environmental risks…

and either

  - do not have peer-reviewed human health standards

or

  - Standards/regulations are evolving due to new science, detection capabilities, or pathways.



EC "Scan-Watch-Action" Process

Over -the- horizon

EC News

Review literature, periodicals, regulatory communications, etc.

Possible DoD impacts

Phase I Assessment

Monitor events; Conduct Phase I qualitative impact assessment

Probable high DoD impacts

Phase II Assessment

Conduct Phase II quantitative impact assessment; develop & rank RMOs*

Risk Management Options (RMOs) to ECGC

Approved RMOs become Risk Management Actions (RMAs)

SF6 Phase I Impact Assessment

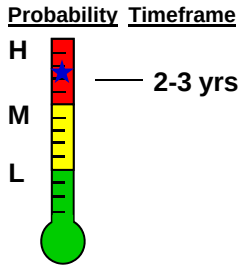
Completed January 2008

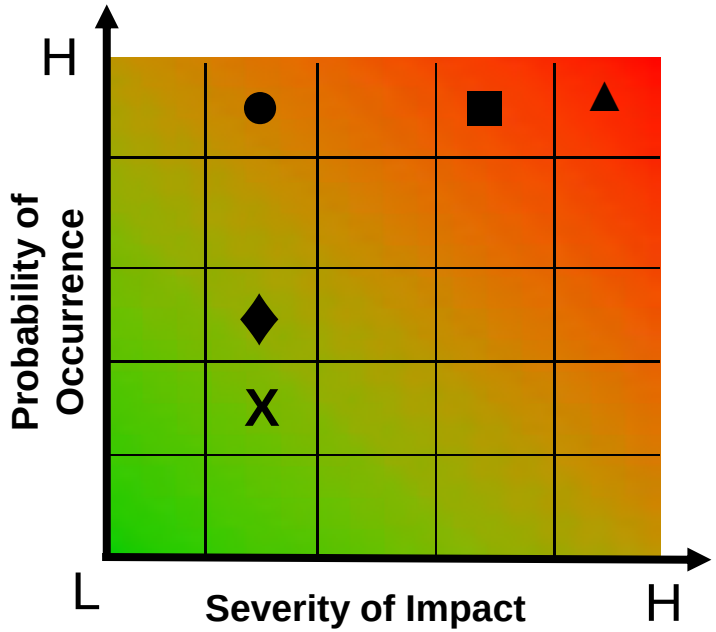
Acquisition, Technology and Logistics

Sulfur Hexafluoride (SF6) is used in radar systems (e.g., AWACS); helicopter rotor-blade leak tests; discharge testing in fire suppression systems; electrical switch gear; and propulsion systems for specific weapons (e.g., MK-50 torpedo) in service and under design.

Likelihood of Toxicity Value/ Regulatory Change

1. **Probability that Greenhouse Gas emission initiatives will restrict use/availability of SF6**





- ♦ ES&H
- ■ Training & Readiness
- ▲ Acquisition/RDT&E
- ● PO&MD of Assets
- X Cleanup

EC Watch List – Sep 2010

- ✓ Tungsten alloys
- Sodium Tungstate
- ✓ Tetrachloroethylene (PCE)…de-listed
- ✓ Dioxin…de-listed
- ✓ 1,4-dioxane*
- Nanomaterials
- ✓ Perfluorooctyl sulfonate (PFOS)
- ✓ Di-nitrotoluenes (DNT)
- ✓ Nickel
- ✓ Cadmium
- ✓ Manganese
- Cerium
- Cobalt
- Antimony
- ✓ Perfluorooctanoic acid (PFOA)…moved from action list
- Phthalates …recently added
- Diisocyanates …recently added
- TCE …moved from action list
- Perchlorate …moved from action list

✓ Phase I Impact Assessment completed

* To be re-assessed

EC Action List - Sep 2010

- ✓ **Perchlorate**...downgrade to watch list
- ✓ **Royal Demolition eXplosive (RDX)**
  - **Cyclotrimethylenetrinitramine**
- ✓ **Trichloroethylene (TCE)**...downgrade to watch list
- ✓ **Hexavalent Chromium (Cr6+)**
- ✓ **Naphthalene**...pending downgrade to watch list
- ✓ **Beryllium (Be)**
- ✓ **Sulfur Hexafluoride (SF6)**
- ✓ **Lead**

✓ **Phase II Impact Assessment completed.**

Lead – Why on the Action List?

- **Evolving science & regulations pose a risk to range operations…most munitions contain lead**

- **Lead-free electronics pose a risk to DoD supply chain…short-circuiting in components**

RDX – Why on the Action List?

- **Most munitions contain RDX**
- **RDX residues on ranges can present risk to groundwater and thus range use**
- **EPA is using old toxicity values that don't incorporate latest toxicity research by Army**
- **Toxicity values greatly affect cleanup costs**

Downgrading Perchlorate to Watch List

- **Risk Management Actions have reduced risk**
  - Latest (April 2009) DoD Policy in a series ensures releases are addressed
    - Sampling database with over 50,000 samples
    - Releases mainly contained on installations & remedial actions underway/completed
  - DoD R&D played a key role…Isotopic analysis technique differentiates between natural & man-made sources
  - Congressional, press, and EPA briefings to dispel perchlorate myths
    - Main message: DoD not the major source of drinking water contamination
  - Army R&D on perchlorate substitutes paying dividends
    - New ground burst simulators being deployed
- **GAO Review on perchlorate contamination in U.S. completed July 2010**
  - No recommendations…implies that DoD releases under control…notes non-DoD sources (e.g., fertilizer) contributing to contamination

Downgrading TCE to Watch List

- **Risks to Cleanup Program Costs**
  - DoD & EPA developed interim toxicity levels to avoid regional inconsistencies & disputes
  - Final EPA risk assessment supersedes interim levels but are about the same
  - Cleanups handled routinely by DERP[1]
  - Vapor intrusion issues remain…RMAs underway to address
- **Risks Related to Continued Use**
  - About 80% of DoD use at Anniston Army Depot (ANAD)
  - Major projects underway at ANAD to develop cleaning processes with substitutes

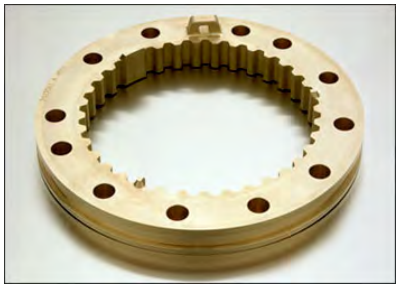
[1] Defense Environmental Restoration Program

Sulfur Hexafluoride (SF6) Background

- **A non-flammable, non-toxic gas**
  - Excellent dielectric properties but high global warming potential
- **Used in DoD weapons systems & platforms**
- **DoD risks**
  - Restricted availability & possible cost increases of 25 times current cost
- **RMOs**
  - Capture & recycling policy signed
  - SF6 bank feasibility being studied by DLA
  - Increased R&D on substitutes

Beryllium (Be) Background

- **Lightweight, non-magnetic metal used in DoD weapons systems & platforms**
  - Strategic, critical material…requires reliable production source
  - Very toxic…OSHA exposure level at 2.0 ug/m^3 (8-hr TWA)…industry action level is 0.2 ug/m^3
- **DoD risks**
  - Occupational exposures during O&M activities
- **RMOs**
  - Response to National Research Council recommendations
    - Key Issues: Use of Be Lymphocyte Proliferation Test for DoD?
  - Life cycle study underway…focus on exposures and recycling



Other Risk Management Actions

- **Naphthalene**
  - A constituent in fuels…possible carcinogen
  - Developed a real-time dosimeter via SBIRP[1]…new technology
  - Will determine more accurate exposure to fuel handlers
  - Exposure testing in FY-11 after human testing approval
- **Hexavalent chromium (Cr6+)**
  - DoD minimization policy signed
    - DFAR clause to minimize new uses being finalized after public comment
  - Accelerated corrosion testing protocol being developed
  - Pilot study funded on minimizing legacy uses
    - Work with specification owners to specify suitable substitutes
  - DoD-wide database established on suitable substitutes - managed by DDR&E, SERDP/ESTCP office

[1] Small Business Innovative Research Project

EC Program Highlights

- **Screened 391 potential ECs**
- **Completed 24 Phase I Impact Assessments**
  - Deployed “groupware” decision software
- **Completed 7 Phase II Impact Assessments**
  - Beryllium, lead, sulfur hexafluoride (SF6), hexavalent chromium, naphthalene, trichloroethylene (TCE), perchlorate[1], & RDX[2]
- **47 Risk Management Options (RMOs) developed & turned into Risk Management Actions (RMAs)**
  - 27 in-progress, 19 completed, 1 deferred (low risk)

[1] Perchlorate was original EC – no Phase II assessment but RMOs developed and approved by ECGC

[2] A defense related explosive compound

Questions & Discussion

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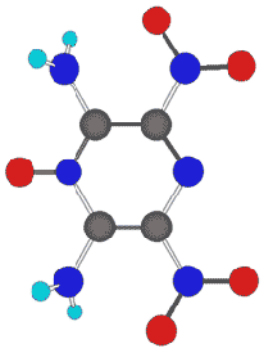

Extra Slides

How Can ECs Affect DoD?

- **Cause adverse health effects on operating forces, DoD employees, and/or public**
  - Human health protection paramount
- **Reduce training/readiness**
  - Restrictions on use of ranges
- **Restrict availability and/or cost of materials or chemicals**
  - Adverse impact on mission-critical applications & industrial base community
- **Increase O&M and/or cleanup costs**
  - Resource drain from mission needs

Planned FY-11/12 Phase I Impact Assessments

- **Nanomaterials…completed Nov 2010**
- **Cobalt**
- **Antimony**
- **Phthalates**
- **Diisocyanates**

Challenges

- **Getting data on chemical/material use in DoD**
  - What, where, and how much?
- **Getting knowledgeable Subject Matter Experts for Phase I Assessments**
- **Communicating EC risks to developers, PMs, and industry**
  - Posting on “Acquisition Community Connection” web site has helped
  - Acquisition Program Support Reviews should help
- **Catch-22**
  - Safer chemicals/materials require T&E for DoD applications
  - T&E affects cost & schedule of programs, thus avoided

Phase I Impact Assessment Process

Acquisition, Technology and Logistics

1 **Likelihood of Toxicity Value/Regulatory Change**

2 **Scoping and Data Collection**

3 **Impact on DoD Functional Areas**

ES&H	Training & Readiness	Acquisition/ RDT&E	POMD of DoD Assets	Cleanup
H	H	H	H	H
M	M	M	M	M
L	L	L	L	L

Results:

- **Recommendation – Move to Action List?**
- **Initial Risk Management Options**